

Specification: Extended AutoTrace Function for QGIS

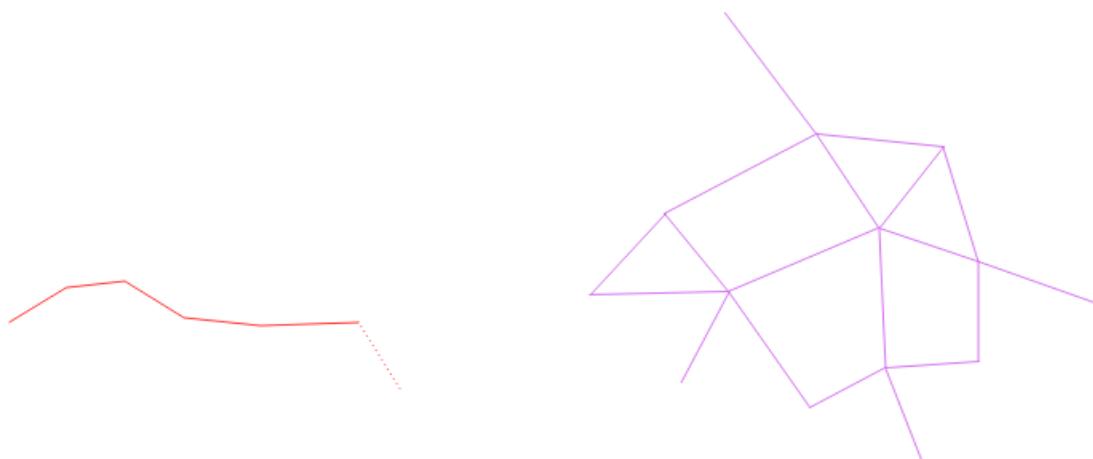
This specification describes advanced tracing functionality proposed for QGIS.

This tool is a logical progression of the AutoTrace plugin previously developed for QGIS by Lutra Consulting which has trace functionality similar to that seen in MapInfo.

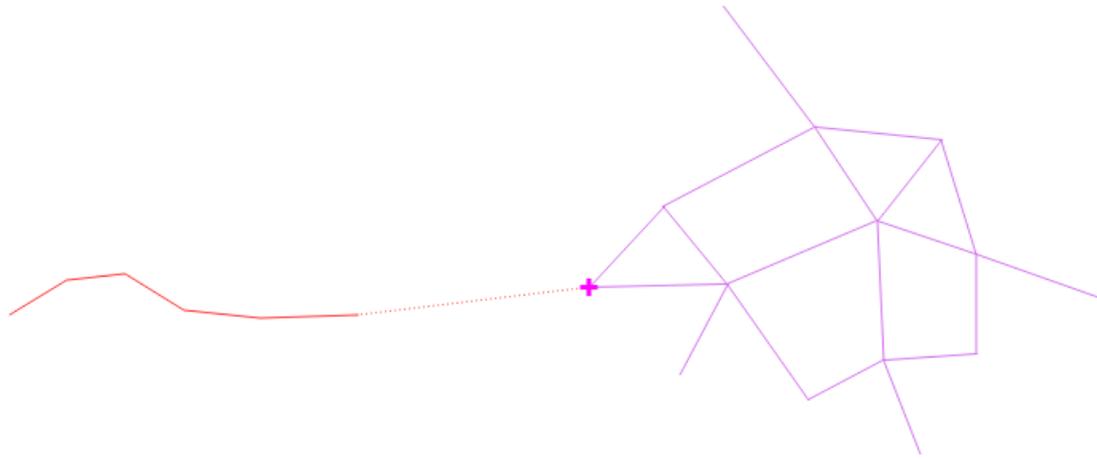
The project is also known as *AutoTrace Phase 2*.

Typical Workflow

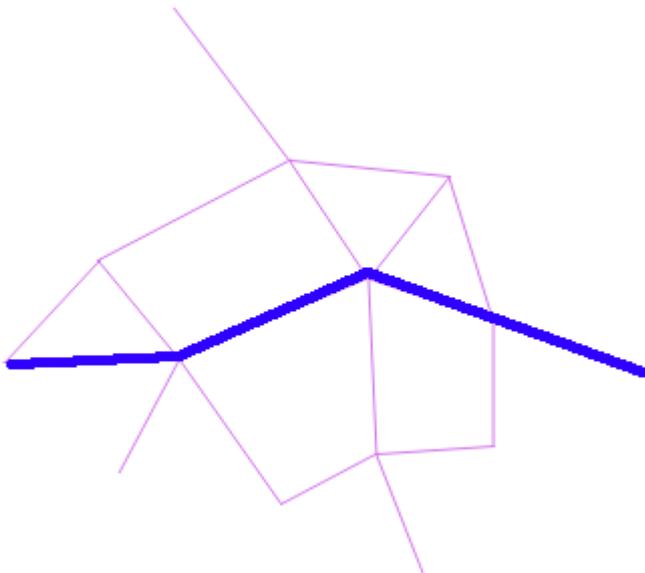
1. User enables the trace Map Tool and starts to digitise the starting segments of a line (not tracing at this moment).



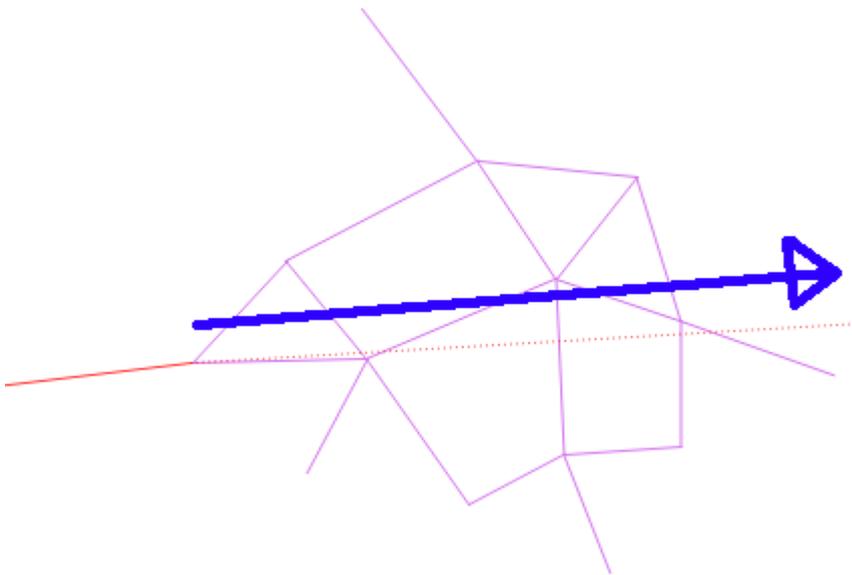
2. They now want to trace a path through a roads layer (purple lines on the right). The roads layer contains linestrings. The user can be confident that lines which appear to be connected are indeed snapped and share a vertex.
3. The user now hovers the mouse over the roads (see below). A snap indicator shows which vertex will be snapped to if they left-click. They now left-click to 'attach' to the road network which activates tracing mode. If the user did not mean to 'attach' to the road network, they could always use the backspace key to undo the addition of the last vertex and suspend tracing mode.



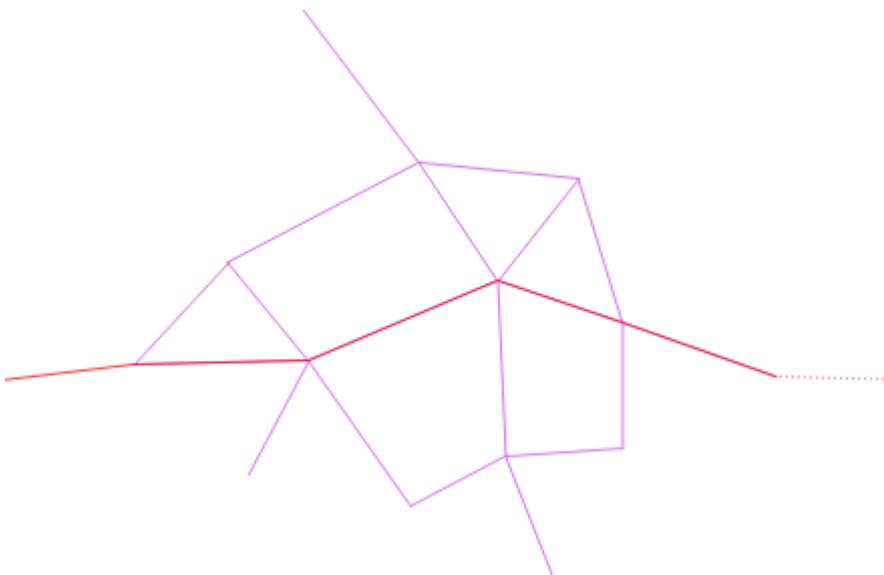
4. The user now wants to trace the route shown in blue below:



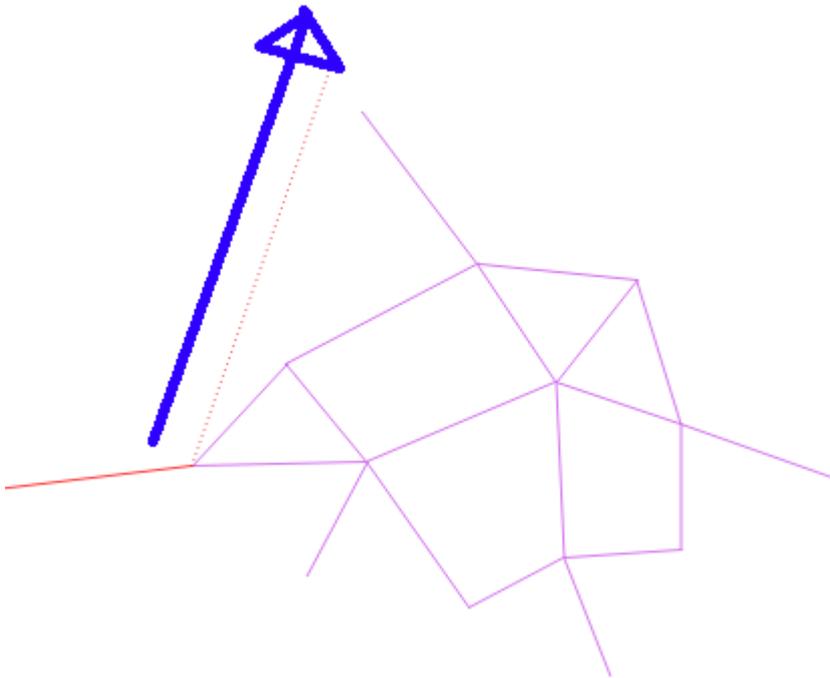
5. They simply move the mouse cursor along the red dotted line shown below in the direction of the blue arrow:



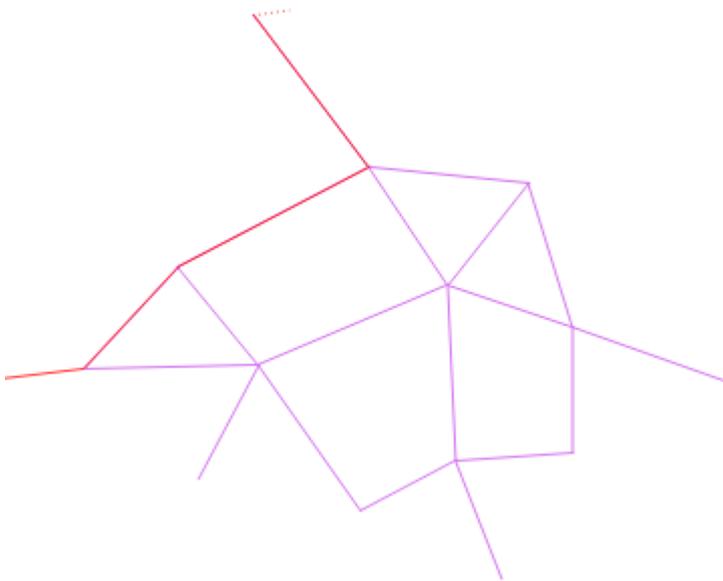
6. As the user moves the mouse along the red dotted line above the map Tool will:
 - a. Continuously determine the closest vertex (v) to the cursor
 - b. Route the shortest path from the current trace to (v)
 - i. Considering the features from all visible layers as the network across which to route.
 - c. Add that path to the trace
7. Moving the mouse along the blue path above therefore yields the following trace:



8. Alternatively, moving the mouse along the following blue line:

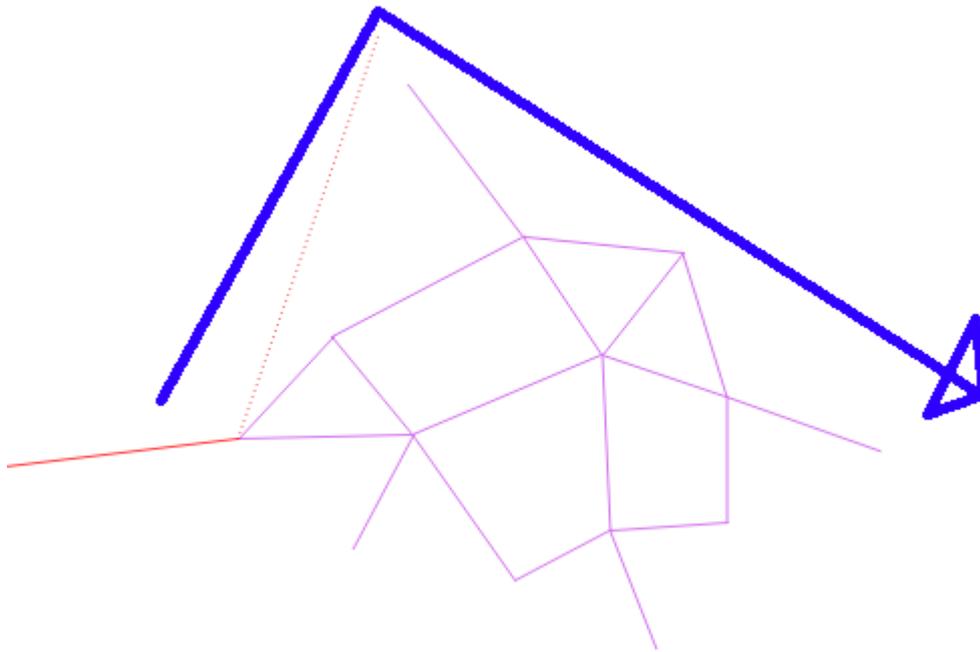


9. Would yield the following trace:

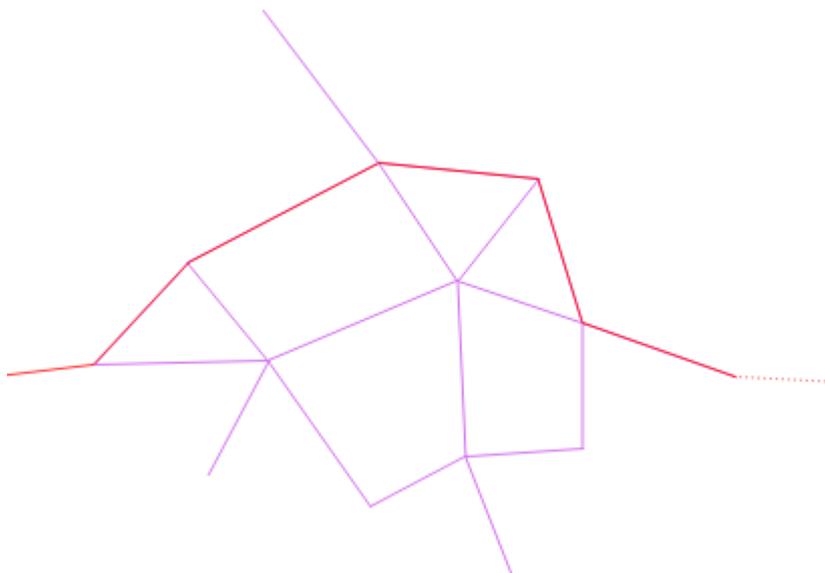


Amending the trace

10. The user can also move the mouse back along a trace to 'undo' a section that they have added by mistake. For example, if they moved the mouse along the following blue line:



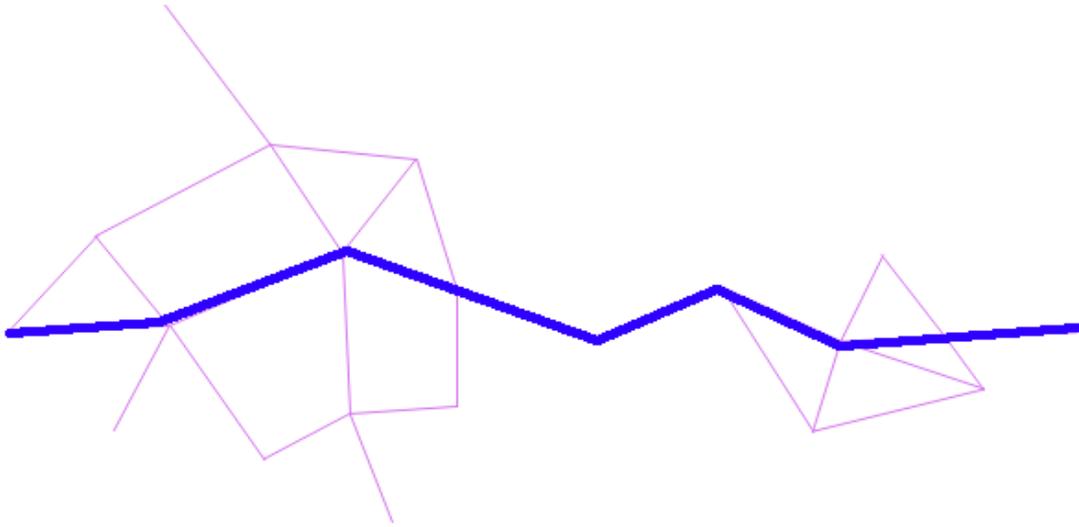
11. Then they would end up with a trace that looks like this:



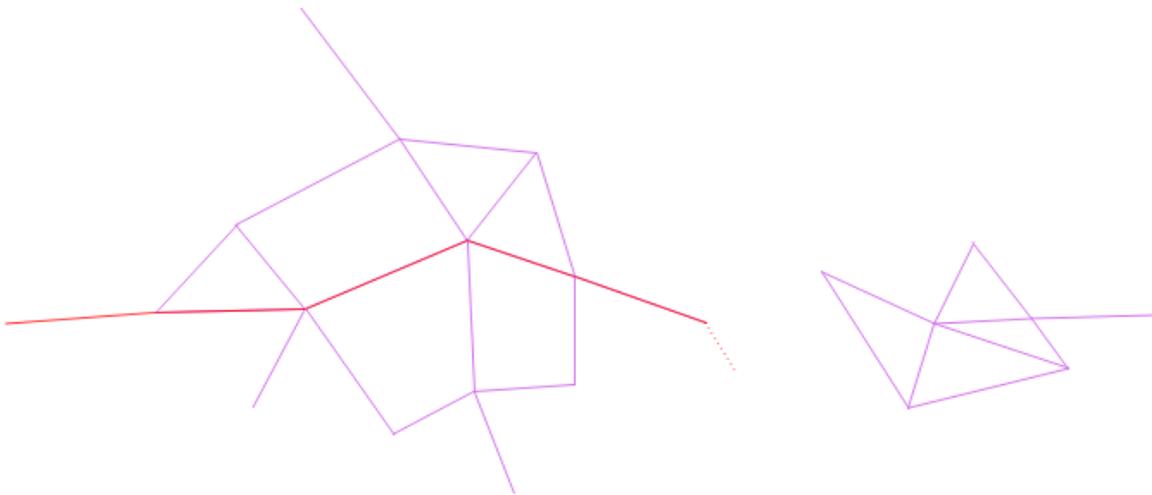
12. Notice that the northern-most road has been omitted from the trace. As the user moved their mouse down the second segment of the blue line shown above, they would have been tracing **back** along the northern-most road in order to reach the eastern part of the map. Therefore the northern-most road is omitted from the trace.
13. At any point the user can left-click to accept the portion of the trace made already. In addition to accepting the current trace, the left-click also suspends trace mode allowing the user to continue to digitise non-traced vertices.

Moving Between Features

14. The user now wants to continue tracing along a separate group of features that are not topologically linked. The line / path they wish to digitise is shown in blue:

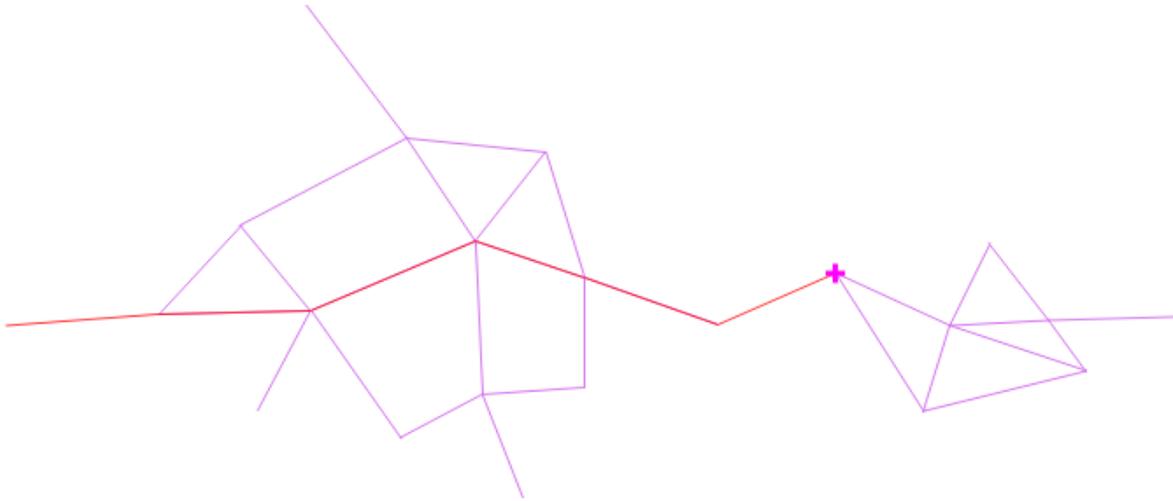


15. They first left click to confirm the trace they have so far made on the western network:



16. The left click has also suspended trace mode.

17. Next they left-click on the eastern network to 'attach' to it and re-enable trace mode:



18. Tracing can now continue as before along the eastern network.

Finishing digitising

19. To finish digitising the user would:

- a. Left-click to accept the current trace and suspend trace mode
- b. Right-click to finish digitising (as the user would do normally when digitising a feature through the Add Feature Map Tool).

User Requirements

The following requirements state what AutoTrace 2 (at2) should provide.

- at2 should facilitate the Typical Workflow shown above.
- at2 should provide a new digitising tool (QGIS Map Tool) for digitising linestrings and polygons.
- at2 should show a preview of the trace as it is being made.
- at2 should be able to trace across separate features within any visible layer if they touch or intersect, even if they do not share a vertex at the point they intersect.
- User should be able to pan and zoom the map during tracing without negatively impacting any trace in-progress (e.g. using middle click to pan, scroll wheel to zoom).
- at2 should temporarily suspend tracing if the number of vertices of visible layers present on the map canvas exceeds a user-defined threshold.
 - This function is intended to prevent the tool from becoming unresponsive in the event of having to trace across large number of vertices. The user should be able to disable this feature if they wish. It should have sensible default value(s).

Limitations of functionality

Planned features are described above. This section explicitly states features which will not be implemented / possible as part of this release of the tool.

- Cutting or reshaping an existing feature using a live trace